Unit 2 – Creating Systems To Manage Information

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Part A – Databases, Queries and Reports

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A1.1 – Key Database Concepts

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Learning Objectives

To be able to understand what is meant by table, row and column.

To be able to identify different datatypes.

To be able explain what is meant by Primary Key.

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What Is A Database?

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What are databases?

All organisations need to store data.

This could be employee data, customer data, business data.

Each of this data will need to be contained in a structured, organised form.

We can use this data to answer questions, turning it into ***information***.

The system used to hold data in an organised form is called a ***Database***.

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What is Data?

Data is a single fact that is used to help describe a real-world object or thing.

For example – in a school, Student data could include:

First Name, Last Name, Age, Date of Birth, Predicted Grade.

Each of these represents a **single fact** about a student at a school or college.

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What Is Information?

- This could be gathering a set of data together to give it meaning.
- For example, take the following data items:
- First Name: **John**.
- Last Name: **Smith**.
- Age: **17**.
- Predicted Grade: **DMM**.
- This is just ***Data.***

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What Is Information?

If we look at all these items together…

We are now referring to a **17-year-old** student, **called John Smith**, who has a **predicted grade of DMM**.

This is now ***Information***.

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What Is Information?

Information could also be using data to find answers to questions such as:

How many students are there in the school aged 17?

Who are the students with a predicted grade of DDM?

Who are the female students doing BTEC IT Unit 2?

The answers to these questions is ***information***.

We use ***Queries*** to extract information from data, and we will look at this in a later lesson.

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What Are Queries?

Queries use simple maths to turn data into information.

For example, the query *How many students are there in the school aged 17?*

This will be solved by ***adding up*** all the students ***where*** the ***age = 17.***

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What Is An RDBMS?

Data and information are stored in Databases.

A database is a collection of organised data stored in tables.

The software used to create and use databases are called ***Relational Database Management Systems*** (RDBMS) .

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What Does An RDMBS Do?

A RDBMS will allow us to:

Easily add, remove, change and retrieve information and data from a database.

Create tables and the links between them.

Monitor the database and make sure that the data is consistent.

This Unit will use the **Microsoft ™ Access RDBMS.**

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Class Tasks 1.1.1 – Data and Information

Look at the following list of Items for each given scenario.

Identify whether these are data or information and explain why. If the item is information, what calculations are being carried out? The first one has been done for you.

Discuss your findings with the group.

Time allowed: 12 minutes

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What Is A Table?

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What Are Tables?

You should have seen some tables by now.

You should have seen them in maths, or in IT.

A table is where data is organised into rows and columns.

Rows go ***horizontally***, tables go ***vertically***.

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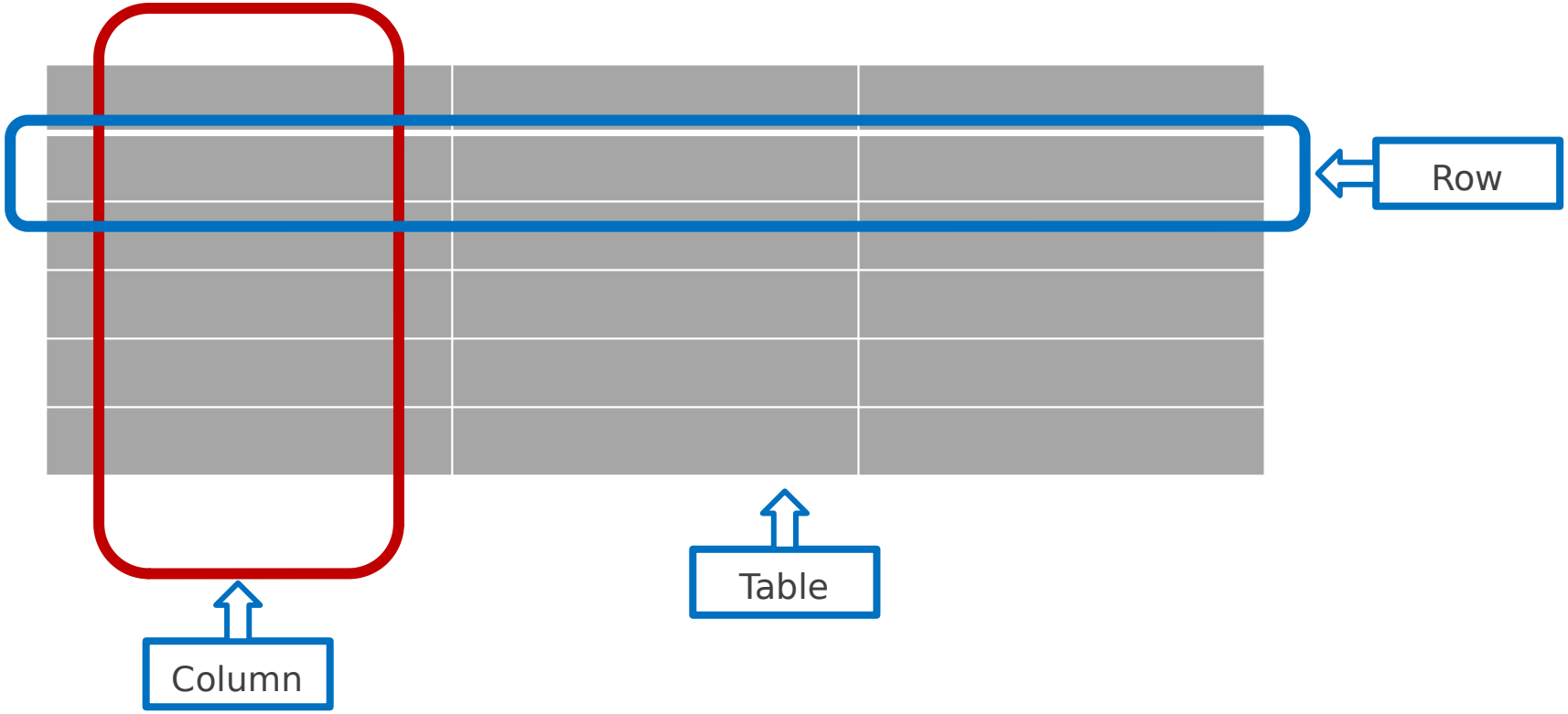
Tables With Rows And Columns



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What Are Tables In A Database?

A table is a collection of related data items that has a ***meaning***.

For example, you might have a table of Student data.

This contains all the data items relating to a Student.

If you have any data items belonging to a Teacher, then it ***does not belong*** in the Student table.

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What Are Tables In A Database?

Tables usually describe Objects or Things.

Table Names usually have Nouns as titles.

This describes the thing we are trying to store information about.

Examples of tables could include ***Book, Vehicle, Employee, Author, Student, Lesson, Staff***.

Each of these are ***NOUNS***.

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EXAM TIP – Naming Tables

- In your exam, you will need to give your tables a name.
- We will look at this later this lesson.
- Tables usually start with '**tbl**' – **tbl**Student, **tbl**Teacher.
- If you have multiple words in your table name ***DO NOT USE SPACES***.
- For Example: ***tblStudentData*** **NOT** ***tbl Student Data.***
- This is very bad practice and might cause your database to misbehave.

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We Are Creating A Database Of Students

We know we will need a student table.

We don’t know anything else about it at present.

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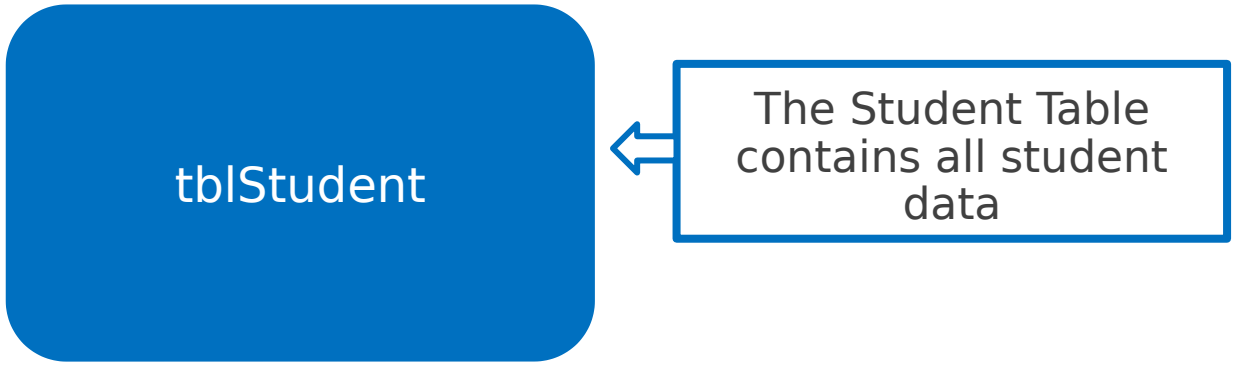
The Student Table In A Database



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What Are Rows, Columns and Cells?

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What Are Columns In A Database Table?

Columns are called ***Fields*** or ***Attributes***.

They are usually facts that help ***describe*** an individual item of information we are trying to store. They can be thought of as ***properties*** of the object.

As we have seen, the Student table might have the following fields: **First Name, Last Name, Age, Predicted Grade**

All of these will help ***describe*** a student.

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EXAM TIP – Autonumber and Primary Keys

- In your exam, you will be **given** the primary key values to use.
- Autonumber will always start off with the number 1.
- Sometimes you will be given primary keys that start at 100.
- You might be given a sequence of primary keys 1,2,3,4,7,8,9 – you are missing the numbers 5 & 6.
- If you use Autonumber to create your primary key, ***you cannot use these values!***
- ***DO NOT USE AUTONUMBER TO CREATE YOUR PRIMARY KEYS IN YOUR EXAM.***

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Key Terms

Term	Definition
Cell	A single data item in a table. Found where a row and column meet.
Primary Key	A Column whose values provide a **UNIQUE IDENTIFIER** for each row in the table.
Datatype	The definition of the sort of data that can be stored in a column.
Autonumber	A column datatype where the number increases by 1 for each new row.
Key Field	A column that contains some form of key – Primary or otherwise
Non-Key Field	A column that does not contain some form of key

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Self-Check: Lesson Review

- Do I understand what is meant by a database?
- Can I explain what is meant by a table?
- Can explain what is stored in rows, columns and cells?
- Can explain what is meant by a datatype?
- Can I explain what is meant by a Primary Key?

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Further Reading

Websites

https://teachcomputerscience.com/database-management-systems-dbms/

Videos

Textbook:

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